

SIT Graduate Institute/SIT Study Abroad SIT Digital Collections

Independent Study Project (ISP) Collection

SIT Study Abroad

Spring 2013

Tanzanian Agricultural Markets and the Resulting Effects on Farmers Market Mechanisms at a Local Level in the Western Usambara's Lushoto District

Carson A. Casey
SIT Study Abroad

Follow this and additional works at: https://digitalcollections.sit.edu/isp_collection



Part of the [Agricultural Economics Commons](#)

Recommended Citation

Casey, Carson A., "Tanzanian Agricultural Markets and the Resulting Effects on Farmers Market Mechanisms at a Local Level in the Western Usambara's Lushoto District" (2013). *Independent Study Project (ISP) Collection*. 1635.
https://digitalcollections.sit.edu/isp_collection/1635

This Unpublished Paper is brought to you for free and open access by the SIT Study Abroad at SIT Digital Collections. It has been accepted for inclusion in Independent Study Project (ISP) Collection by an authorized administrator of SIT Digital Collections. For more information, please contact digitalcollections@sit.edu.

Tanzanian Agricultural Markets and the Resulting Effects on Farmers
Market Mechanisms at a Local Level in the Western Usambara's Lushoto District

By
Carson A. Casey

University of Vermont
School for International Training, Tanzania:
Wildlife Conservation and Political Ecology
Advisor: Reese Mathews
May 2013

Acknowledgements

I would like to thank Sokoine University of Agriculture and the Mazumbai staff for allowing me the opportunity to use the facilities and conduct my research in Mazumbai and the surrounding villages!

A heart-felt thank you to David and Richard for keeping us well fed, caring for Mary and myself as though we were part of their families. The fires in the fireplace made all of the difference on the late April rainy nights. To the Mazumbai staff and Bwana Kiparo, thank you for brightening my days in Mazumbai.

Beatrice, I am extremely grateful to have had the opportunity to work with you. Your guidance, patience, and compassion are unmatched. Without your assistance my research would not have been possible. Thank you for constantly ensuring my research was going well, checking in daily to make any adjustments necessary. From the 14-kilometer walks to Mgwashi, to the days spent hiking from Mayo you always kept me in great spirits. You allowed for our long days, which were often extremely tiring, to consistently be enjoyable and exciting! And finally, thank you for being such a great friend!

Mazumbai is beautiful in all of its glory but without my fellow mwanafunzi Mary I would not have been able to truly enjoy all of its wonder! Mary thank you for always providing motivation; especially on those days when we wanted nothing more than to read in the library. Thank you for indulging me in our conversations about what foods we would purchase once making it off the mountain (chocolate first and foremost). Afternoon runs would not have been the same without you along side, our seemingly never-ending search for “the rock.” You kept boredom at bay and are a truly great companion! Thank You!

To my friends and family, thank you for supporting my adventures and allowing me to pursue my studies in Tanzania. I am grateful for all of your motivation, guidance and most importantly patience!

Lastly, I would like to thank all of my supporters in Tanzania. Baba Jack, Mama Jack, Mama Juni, and Baba Jerry. Thank you for welcoming me to Tanzania with open arms. You have allowed for this project to be made possible, without your advice and assistance, I would not have had the opportunity nor knowledge necessary to complete my research. For this I am extremely grateful!

Abstract:

As a developing nation Tanzania is highly dependent on its agricultural sector, serving as a source of income generation for more than 80 percent of the population. Moreover, agriculture in Tanzania currently accounts for more than half of the country's total Gross Domestic Product (GDP). Currently smallholder farmers dominate the Tanzanian agricultural market. In the Western Usambara's Lushoto District there is a high concentration of smallholder farmers who are involved in both the cash crop and subsistence agricultural markets of Tanzania. The sample population was Lushoto District farmers identifying as head of household individuals from either the village of Mazumbai, Mayo, Sagara or Mgwashi. Data was collected through a series of structured interviews with the n=68 farmers as well as n=9 key informant interviews. Types of data collected from interviews included types of crops grown, agricultural inputs, purchasing prices paid, location of crop sales and sale prices. The data collected presented the output side of the agricultural market to be the most significant influencing factor with regard to farmers success. Accessibility to both physical and economic markets are imperative to the sales of farmers crops at good prices.

TABLE OF CONTENTS

<i>Section</i>	<i>Page Number</i>
Acknowledgements.....	ii
Abstract.....	iii
Introduction.....	1
Study Site Description.....	4
Figure 1: Map of Western Usambara & Lushoto District.....	4
Figure 2: Map of Lushoto District with Mazumbai Forest Reserve.....	6
Methods.....	8
Results and Discussion.....	9
Table 1. Crops grown by farmers from the villages of Mgwashi, Mayo and Sagara....	11
Figure 3. Notable trends of crops typically grown together from Personal Observations 2013 ...	12
Figure 4. Distribution of subsistence farming plot size.....	13
Figure 5. Distribution of cash crop farming plot size.....	13
Figure 6. Seed purchasing locations.....	14
Table 2. Mgwashi Duka la Dawa stocking prices, sale prices, and profit per individual item.....	15
Figure 7. Pesticide Use on Crops.....	16
Figure 8. Use of fertilizer on crops.....	17
Table 4. Crops with highest incidence of fertilizer use.....	18
Table 5. Mayo small scale businessman.....	21
Limitations, Biases, and	
Recommendations.....	21
Conclusion.....	22
Works Cited.....	22
Appendices	

I.

Introduction

The development of many countries lends to a high level of dependence on agriculture. In the country of Tanzania agriculture employs more than 80 percent of the population. The agricultural sector in Tanzania currently accounts for more than half of the country's total Gross Domestic Product (GDP). Since independence in 1961 Tanzania's agricultural sector has undergone a series of changes, in large part due to the influence of policy reforms.

Following the independence of Tanzania the economic policy was primarily a continuation of the pre-colonial policies. Beginning in 1967 Tanzanian President Julius Nyerere put into action the Ujamaa policy. This policy was presented as "African Socialism," it was an attempt to shift toward a more egalitarian society, with an emphasis on rural development and traditional forms of social organization (Lars Johansson, 2001). During this period farmers were organized into cooperative villages.

Beginning in the mid-1980's Tanzania attempted economic reform with the application of a series of Structural Adjustment Programs. Structural Adjustment Programs (SAPs) are economic policies promoted by the World Bank and International Monetary Fund (IMF) as provisions and conditionals for developing countries to receive structural adjustment loans. The goal of the SAPs in Tanzania was to correct economic imbalances. Conditions set by the SAPs included privatization of state-owned industries, downsizing of government, opening the national economy to foreign competition as well as deregulating the market.

Though a number of governmental restrictions have been phased out since the mid 1980's including a gradual elimination of price controls on outputs, credits, exchange rate and quantitative import controls, farmers still have little purchasing power.

Smallholder farmers currently dominate agriculture in Tanzania. These smallholder farmers generate their income primarily by selling agricultural products. Of the total crops farmed in Tanzania approximately 85 percent fall into

the category of food. The dominant staple food crops include: maize, rice, wheat, pulses, cassava, potatoes, and bananas. Tanzania's main agricultural exports include tobacco leaves, cashew nuts, coffee, cotton, tea, maize, sisal and pulses (Ministry of Agriculture, 2013).

Located in the Tanga region of the Western Usambaras is the district of Lushoto. Here highland techniques are utilized for farming in the nutrient rich soils, this area has been noted to be one of the most biologically diverse environments in all of mainland Africa. In the district of Lushoto are 3 rural farming villages known as Mgwashi, Mayo and Sagara. These villages have a rich agricultural history, as the lands the farmers from the villages utilize today have been farmed for over 2000 years.

In the year 1886 German colonists opened 6 coffee plantations in the mountains of the Western Usambaras including the Sakare, Gare, Soni, Sakharani, Irete and Mazumbai plantations. They settled the highlands introducing the native people of the Wasaamba culture to crops such as quinine, coffee, tea and trees for lumber. Shortly after the arrival of the German colonists they realized the lands were in fact not suitable for coffee plantations. Coffee plantations covered the lands of Mazumbai until the year 1944 when the Mazumbai Coffee Estate (MCE), which was owned by Amboni Estates Ltd. was given to the first general manager Hugo Tanner as a retirement benefit.

Shortly after receiving the coffee plantations Mr. Tanner replaced the coffee plants with tea plants. He recognized the soil was not suitable for the growth of coffee, coffee bushes were dying season after season. This was a notable shift of the cash crop production in Lushoto District.

Currently, agricultural practices include cash crop and subsistence farming in the villages of Mgwashi, Mayo and Sagara. With little access to physical markets the farmers from these rural farming villages have limited control over where crops are sold.

In this study I will examine the market mechanisms affecting the cash crop and subsistence crop farming dynamic in the villages and surrounding areas of Mgwashi, Mayo, and Sagara. For the purpose of this study the term "cash

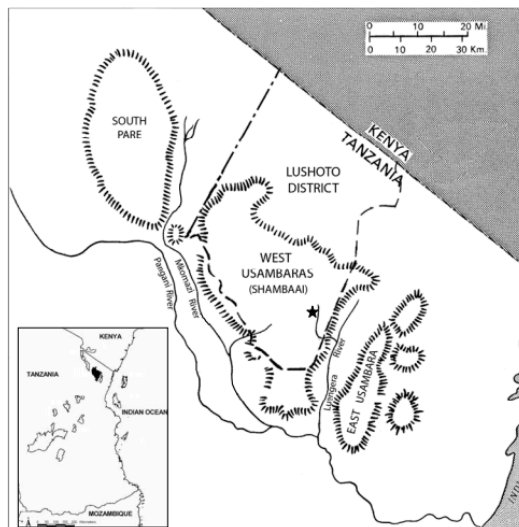
crop” is defined as crops that are produced and sold to external markets (i.e outside of the villages of Mgwashi, Mayo and Sagara). Additionally the term “subsistence crop” is defined as crops that are produced and used within the community. These “subsistence crops” can be sold within the local market but must remain within the surrounding community. For the purpose of this study crops are considered “cash crops” only when they are sold to external markets. The definition of “cash crop” takes priority over the term “subsistence crop” in that if a farmer sells their crops to an external market but also uses a small portion for consumption within the household the crop is still considered a “cash crop”.

This study will attempt to understand how rural farmers are faring within the cash crop and subsistence crop agricultural market at the local level. The success of farmers in the agricultural market will be gauged by analyzing both agricultural inputs and outputs. For the purpose of this study inputs were defined as seeds, pesticides and fertilizer. In the Lushoto District inputs are coming from the local Mgwashi market, Duka la Dawa, and a Non Governmental Organization (NGO) known as Tanzania Forest Conservation Group (TFCG). For the output side of the market business persons purchasing crops from Lushoto District farmers will be studied as well as the Mponde Tea Factory a primary buyer of tea crops in this district.

II. Site Description

Tanzania is highly dependent on its agricultural sector with 82% of Tanzanians using agriculture for means of income generation. Located in Eastern Tanzania, the chain of the Eastern Arc Mountains stretch from Uzungua in Southern Tanzania to the Taita Hills just over the border in Kenya. Falling within the chain of the Eastern Arc Mountains are the Usambara Mountains, situated in Northeastern Tanzania (Appendix A). The Usambara Mountains are split east and west divided by the Lwengera Valley, which runs north to south. The Usambara Mountains have been noted to be one of the most biologically diverse areas in mainland Africa; historically, proving to be highly coveted agriculture land (Iverson, 1991).

Figure 1.
Map of Western Usambara &
Lushoto District
(Beymer, 2005)



The current residents of the Western Usambara Mountains are the people of the Wasaamba (WaShamba or WaShambara) culture, speaking the native tongue of Kisaamba. The Kiswahili word “shamba” translates to “farm”, literally translating Wasaamba to mean “people of the farm.” In the Western Usambara Mountains, the Saamba people have utilized highland farming techniques since

their arrival. The Eastern Arc Mountains act as very important water catchment areas for the condensed precipitation coming from the Indian Ocean. As a result of this system, bi-annual rains cover the Usambara Mountains.

The Western Usambara Mountains have permanent water sources such as streams and rivers that have allowed the Saamba people to inhabit and cultivate here for over 2000 years (VanLeuven, 2012). The Saamba people practiced 'shifting cultivation,' this means clearing plots of forest land for agricultural use, using the land for cultivating crops then shifting to another plot. This allowed for the land to lie fallow and regenerate. The rainfall patterns of the Western Usambaras split the growing seasons into 4 periods: Mwaka, the season of long rains occurring from March to June; Lati, the season of intermediate rains which occur from July to September and Vuli is the season of short rains occurring from October to December. During the months of January and February farmers prepare their land, harvesting few crops (Kiparo, pers. comm., April 2013). The Usambara Saamba people have utilized the natural forests of this area for means of fuel wood, hunting, as well as opportunity for agricultural expansion (Lars Johnson). As populations have increased problems of land scarcity, deforestation and general degradation of the available natural resources have been presented. While the relationships maintained between the Saamba people and the environment was once sustainable, currently the opportunity for agricultural expansion is nearly non-existent, more over environmental issues are on the rise.

Land use in the Western Usambara Mountains has endured many changes as a result of influencing factors including government control, available resources, and time (MFR). Late in the 19th century German colonists arrived in the Western Usambara region bringing with them crops such as quinine, coffee, tea and trees for lumber. Many of the forests in the Western Usambara Mountains have been cleared for agricultural use. Travelling throughout the Western Usambara Mountains, the concentration of farms on steep hillsides as well as they valley bottoms is apparent. In the southeast section of the Western Usambaras lies the Mazumbai Forest Reserve. This area of the Western Usambaras has been specifically noted for its nutrient rich soil condition and abundant rainfall (MFR).

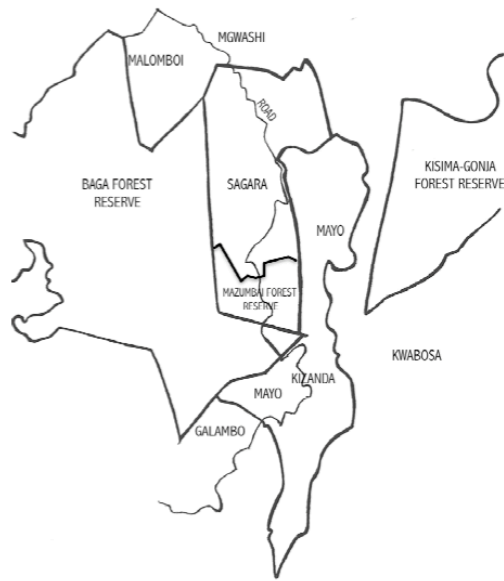


Figure 2.
Map of Lushoto District with
Mazumbai Forest Reserve (MFR)

Due to these favorable factors this area has been utilized for the cultivation of cash crops. Located in the District of Lushoto, the villages of Mgwashi, Mayo, and Sagara border the Mazumbai Forest Reserve. The village of Mayo is comprised of approximately 300 households. Sagara village is comprised of approximately 495 households. Sagara is split into 5 hamlets including Handei, Kwemashai, Kwemtono, and Mazumbai. Mgwashi is the larger of the three villages with a total of approximately 620 households (Abraham, pers. comm. April 2013). North of the Mazumbai Forest Reserve are the villages of Sagara and Mgwashi, the farms between Mazumbai and Sagara are primarily chai and quinine plantations (Personal Observation, April 2013), between Sagara and Mgwashi the farms are primarily vegetable farms, growing crops such as cabbage, carrots, tomatoes, green peppers, beans, maize, cucumber and fruit trees. The village of Mayo borders the Mazumbai Forest Reserve to the East and is comprised of 9km of farms as well as tea and quinine plantations.

III. Methods

This study was conducted between the dates of April 6th and April 23rd, 2013. The study location was selected rural farming villages within Lushoto District, which is located in Tanzania's Western Usambara Mountains. The population frame was farmers from the rural villages of Mayo, Sagara and Mgwashi. The sample population was farmers identifying as head of household individuals from either the village of Mazumbai, Mayo, Sagara or Mgwashi. For the purposes of this study "head of household" was taken to be "mamas" and "babas" as defined by the Wasaamba culture.

Data was collected through structured interviews. Interviewees were selected on a random, opportunistic basis. Farmers were chosen from the villages of Mgwashi, Mayo, and Sagara that are all within the District of Lushoto. Farmers from these four villages overlap in where their agricultural inputs are coming from. There is also an overlap in where farmers from these villages are sending their agricultural outputs (Personal Observations, April 2013). In addition to interviewing (n=68) farmers, (n=9) key informant interviews were conducted. The key informants included: Mgwashi Duka la Dawa owner, Tanzania Forest Conservation Group Representative, Lushoto District Agricultural Office, Mazumbai Mzee (oral history), Mgwashi business persons, Mayo business persons, Mazumbai chai nursery owner and Mponde Tea Factory Assistant Manager.

Specific Methods:

Oral Interviews:

For the purpose of this study a translator was used. Beatrice assisted in the daily travels and conducted the translation of interviews. She is from the village of Sagara and was 29 years of age when this study took place. In addition to working with me translating my interview questions she also works on her family's farm, located in Sagara. The interview questions were written in English and translated into both Kiswahili and Kisaamba. Initial introductions were done in Kiswahili, I completed this portion without the assistance of Beatrice. This

introduction included my name, where I am from, introduction of myself as a student and a brief synopsis of what I am studying. I then asked their name, where they are from and if they are a farmer. If they did in fact farm we proceed with the interview.

The interviews were translated into Kiswahili and if further clarification was necessary the use of Kisaamba was employed (Appendix B). Types of data collected from interviews included types of crops grown, agricultural inputs, purchasing prices paid, location of crop sales and sale prices.

Daily Methods:

The villages of Mgwashi, Mayo, and Sagara are bisected by the Bumbuli Mgwashi public road (Personal Observation 2013). Starting on the date of Saturday April 6th, 2013 both Beatrice, my translator, and myself started our interviews by walking North (toward Mgwashi village). The first day of interview we walked North on the Mgwashi Bumbuli public road with the following day walking South (toward Mayo village), alternating days between walking North and South on the Bumbuli Mgwashi. Our daily interviews were conducted with the first five farmers we would pass (on the final day 6 interviews were completed). The selection criteria were that they had not been interviewed by myself day's prior, self identified as head of household and identified as a farmer from one of the villages of Mazumbai, Mayo, Sagara or Mgwashi. For the period of my research I stayed at the Sokoine University housing for the Mazumbai Forest Reserve (MFR, previously home of the Tanner Family). This location was approximately half way between the furthest villages of my study site, Mgwashi (approx. 7 km to the North) and Mayo (approx. 6 km to the South). This was the daily starting point; I would leave with my translator at 8 am every morning, returning at varying times. It was important we left at the same time each day because it allowed for us to interview farmers as they travelled to their farms. Many of the farmers travel to their farming plots early in the morning as it is often a far distance from their respective villages. On Sundays interviews were conducted

nearby or in the homes of farmers. We stayed in the Mazumbai hamlets on Sundays because many of the residents from the surrounding villages of Mgwashi, Mayo, and Sagara attend church on Sundays and do not always go to their farms.

Results and Discussion:

This study examined the market mechanisms affecting the cash crop and subsistence crop farming dynamic in the villages and surrounding areas of Mgwashi, Mayo, and Sagara. Data was collected through structured interviews with a total of n=68 farmers who identified as head of household (as defined by the Wasaamba culture) and were from the village of Mgwashi, Mayo or Sagara. I interviewed a total of 28 farmers who identified as babas and a total of 40 farmers who identified as mamas. The interviewees were chosen on a random opportunistic basis.

For the purpose of this study the term “cash crop” was defined as crops that are produced and sold to external markets (i.e outside of the villages of Mgwashi, Mayo and Sagara). Additionally the term “subsistence crop” was defined as crops that are produced and used within the community. These “subsistence crops” can be sold at the local market but must remain within the surrounding community. For the purpose of this study crops are considered “cash crops” only when sold to external markets. The definition of “cash crop” takes priority over the term “subsistence crop” in that, if a farmer sells their crops to an external market but also uses a small portion for consumption within the household the crop is still considered a “cash crop”. In the rural farming villages of Mgwashi, Mayo and Sagara a variety of crops are grown. These crops are divided between both cash crops and subsistence crops.

For the purpose of this research the physical agricultural markets studied were all within Tanga region with an additional port city outside of the region, Dar es Salaam. These locations were comprised of two small-scale, primarily local, markets Mgwashi and Bumbuli; Soni market which is a medium scale market with higher traffic passing through than either Mgwashi or Bumbuli. From Soni crops being transported for sale typically go to the port cities of Tanga or Dar es Salaam.

Table 1.

Crops grown by farmers from the villages of Mgwashi, Mayo and Sagara. Percentages were calculated out of n=68. Data collected from structured interviews (n=68) with translator in Sagara, Mayo and Mgwashi villages, April, Tanzania 2013.

Note:

- Crops **bolded** did not have an exact translation
- All charts are listed in Kiswahili this chart can be used for reference

As defined for the purpose of this study “cash” and “subsistence” crops as defining labels can transition throughout the year depending on crop yields. Farmers noted when they have high crop yields they sell their crops to business persons. It was noted that where farmers sell their crops is also highly dependent on crop yields. Rainfall is a significant determining factor for crop yields of farmers in the Lushoto District as the average plot size was 2.74 Acres. Of the farmers interviewed from the villages of Mgwashi, Mayo and Sagara, 25 inherited their plot for farming, 40 purchased and three individuals both purchased and inherited the land from his/her *babu* (grandfather). The average inherited plot size was 3.08 Acres while the average for individuals purchasing land was approximately 2.54 Acres.

The range of plot size was between .5 Acres and 6 Acres for the n=68 farmers interviewed. The individual farmers of Lushoto District typically own two plots of land, generally of varying size. One plot is used for cash crops such and one for subsistence crops. Mixed farming is used on many farms, allowing the farmers to maximize productivity of their farmlands. Currently there is a high diversity of the crops grown by farmers in Lushoto District (Table 1).

English	Kiswahili	% Farms Growing
Tea	Chai	52.94%
Cabbage	Kabichi	7.35%
Coffee	Kahawa	11.76%
Beans	Maharage	94.12%
Maize	Mahindi	95.59%
Spinach	Mchicha	7.35%
Cassava	Mihogo	51.47%
Sugar Cane	Miwa	19.12%
Banana	Ndizi	0.5
Tomato	Nyanya	35.29%
Bitter Tomato	Nyanya Chungu	4.41%
Green Pepper	Pili Pili Ho Ho	19.12%
Irish Potato	Viazi	7.35%
Gryvellia	Mkabela	5.88%
Avocado	Parachichi	11.76%
Sweet Potato	Viazi Viatamu	10.29%
Taro	Mayugwa	16.18%
Pumpkin	Maboga	1.47%
Onion	Vitunguu	1.47%
Quinine Trees	Kwinini	1.47%
Similar to Yams	Magimbi	14.71%
Agrocopus	Agrocopus	1.47%
Cardamon	Iliki	10.29%
n/a	Kunde	2.94%
Carrots	Karoti	4.41%
Eucalyptus	Eucalyptus	1.47%
Oranges	Machungwa	1.47%
Santarose	Santarose	1.47%
Peaches	Fyokas	1.47%
Lemon	Limao	1.47%
Cucumber	Tango	1.47%
Peanuts	Karanga	1.47%

The trends for crops that are typically grown together were indicated by the amount of water necessary to grow the specific crop. The crop trends included:

Crops Typically Grown Together	
Cash Crops	Subsistence Crops
Kahawa, Iliki, Chai	Maharage, Mahindi
Pili Pili Ho Ho, Nyanya, Nyanya Chunguu, Vitunguu, Kabichi	
*Note: Sometimes matunda (fruit) trees are found in chai or kahawa plots	Mayugua, Magimbi, Mihogo, Viazzi, Viazzi Vitamuu,

Figure 3. Notable trends of crops typically grown together from Personal Observations 2013 and n=68 informant interviews. Data collected from structured interviews (n=68) with translator in Sagara, Mayo and Mgwashi villages, April, Tanzania 2013.

Historically the farmers of Mgwashi, Mayo and Sagara have primarily worked as subsistence farmers. Of the n=68 farmers interviewed all but 3 farmers (95.6%) (65/68) owned some amount of land used for subsistence farming (Figure 3). The three individuals who did not own a plot of land for subsistence farming noted it was because they did not need to, they purchased all of the crops used for food in their homes at the market. The average size of plots used for subsistence farming was 1.34 Acres whereas the average plot size for cash crops was 2.62 Acres. Of the farmers interviewed 80.88% (55/68) identified as owning a plot used for cash crops (Figure 4).

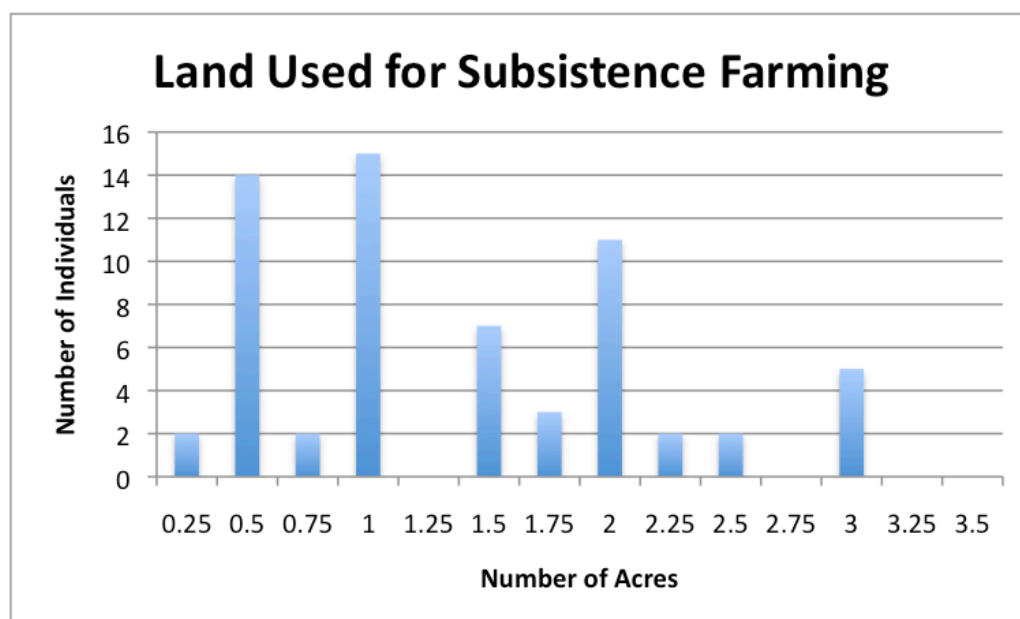


Figure 4. Distribution of subsistence farming plot size. Data collected from structured interviews (n=68) with translator in Sagara, Mayo and Mgwashi

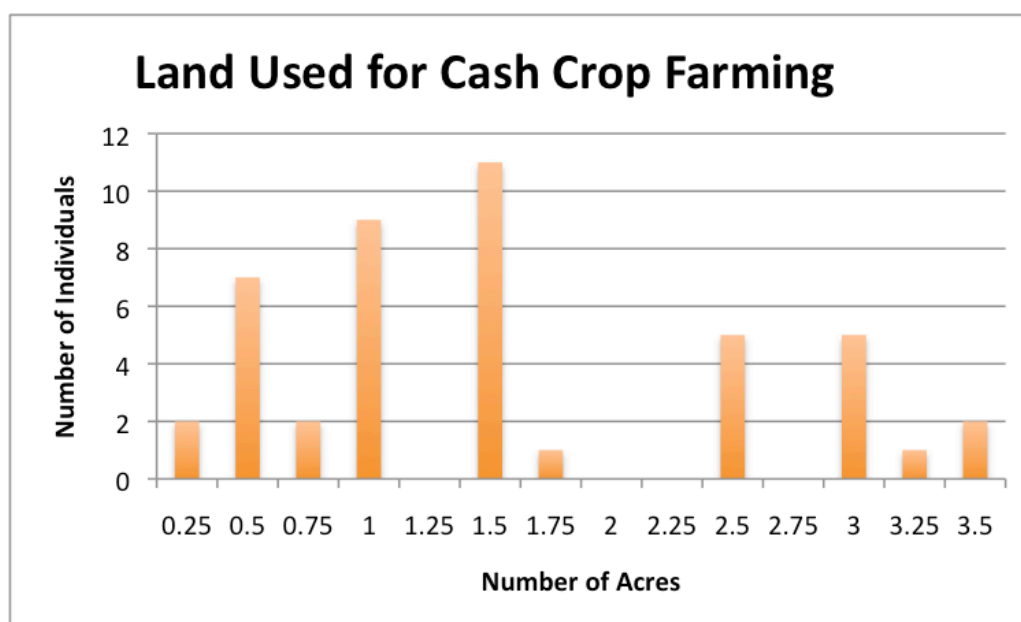


Figure 5. Distribution of cash crop farming plot size. Data collected from structured interviews (n=68) with translator in Sagara, Mayo and Mgwashi villages, April, Tanzania 2013.

Agricultural Inputs:

Agricultural inputs such as seeds, pesticides and fertilizer can highly impact both the productivity and overall crop yields. In the villages of Mgwashi, Mayo and Sagara there are three locations in which farmers can obtain seeds for their farms. These locations include the Bumbuli/ Mgwashi market, Mgwashi Duka La Dawa, or a primary donor (e.g. TFCG donations).

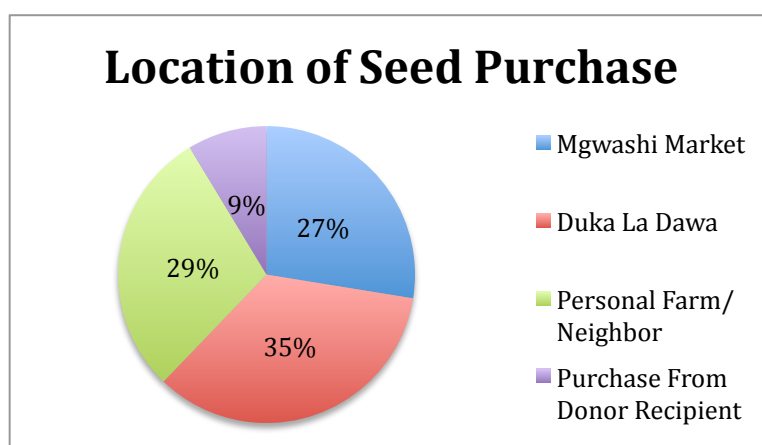


Figure 6. Seed purchasing locations. Data collected from structured interviews (n=68) with translator in Sagara, Mayo and Mgwashi villages, April, Tanzania 2013.

Mamas and babas are unfortunately unable to buy all of the seeds necessary to support their farming plots in the local Mgwashi market. The seeds used crops most often being purchased at the Mgwashi or Bumbuli markets include *maharage*, *kundi* and *mahindi*. The crops at the market are purchased in the following measurements:

5 kilograms	1 bucket/bakini	20 liter bucket
1 Tanga	6 buckets/bakini	20 liter bucket
	Mikungu/ Cone	Used for the sale of bananas

The price farmers pay for seeds at the market highly fluctuates from season to season. During periods of high crop yields, most specifically times of harvest after seasons of good rain, mamas and babas will purchase *mahindi* or *maharage* for use the following season. This allows them to utilize the low sale price. During the period of my

research the noted average price for a bucket of *maharage* was 20,000 TShs, 18,000 TShs for *kundi* and 15,000 TShs for non-treated *mahindi*. Farmers noted buying *maharage* during harvest period for 15,000 TShs per bucket. Of the farmers interviewed 27% (35/68) reported buying seeds from the market.

The Mgwashi duka la dawa is the primary supplier of seeds, pesticides and fertilizer to farmers. A key informant interview was conducted with the owner. The stocking and sale prices were noted in order to understand if farmers can afford to purchase these inputs from the duka la dawa. Of the items stocked the average profit per sale of an individual item was 1856.25 TShs. The seeds being purchased from the duka la dawa include *mboga mboga* (vegetables) and *mahindi*. Understanding the purchasing location and average priced paid for the seeds was vital to understanding the Lushoto District agricultural market in a holistic sense.

Table 3. Mgwashi Duka la Dawa stocking prices, sale prices, and profit per individual item. Data collected from structured interviews (n=68) with translator Mgwashi village. April, Tanzania 2013.

Goods	Amount (grams)	Stocking price	Sale Price	Profit per Individual Sale
Nyanya	100	8000	10000	2000
Nyanya	50	4500	6000	1500
Nyanya	25	3500	4500	1000
Tango	100	7000	15000	8000
Pili Pili Ho Ho	100	12000	15000	3000
Pili Pili Ho Ho	50	7000	8000	1000
Vitunguu	50	4500	6500	2000
Kabichi	50	3000	4500	1500
Nyanya Chunguu	25	1500	2000	500
Mahindi na Dawa	2 kg	7000	8000	1000
DAP	1 kg	900	1600	700
Suthane 80 WP	1 kg	7000	9000	2000
Farmerzeb 80 WP	1 kg	7000	9000	2000
Linkmil 72 WP	25 g	3000	4000	1000
Booster	1 liter	2500	3,500	1000
Vegimax	125 g	3500	5000	1500

Many farmers supplement with seeds from the duka when they are unable to supply their farms solely using seeds put aside from their personal. 60.3% (41/68) of the farmers interviewed reported using pesticides on their crops. This percentage excludes the use of seeds purchased from the duka or donated to the farmers that are pretreated with fungicides and insecticides. Pesticides were most often applied to *mahindi*, *nyanya* and *pili pili ho ho*. Vegetable crops such as *nyanya* and *pili pili ho ho* are far more susceptible to blight and fungus, requiring the application of pesticides for successful harvests. Of the farmers interviewed 39.7% (27/68) reported not using pesticides on their crops. The reasons farmers listed for why they chose to not use pesticides included: crops did not need pesticides, insects and fungus were not a problem and most often because they did not have enough money to purchase the pesticides.

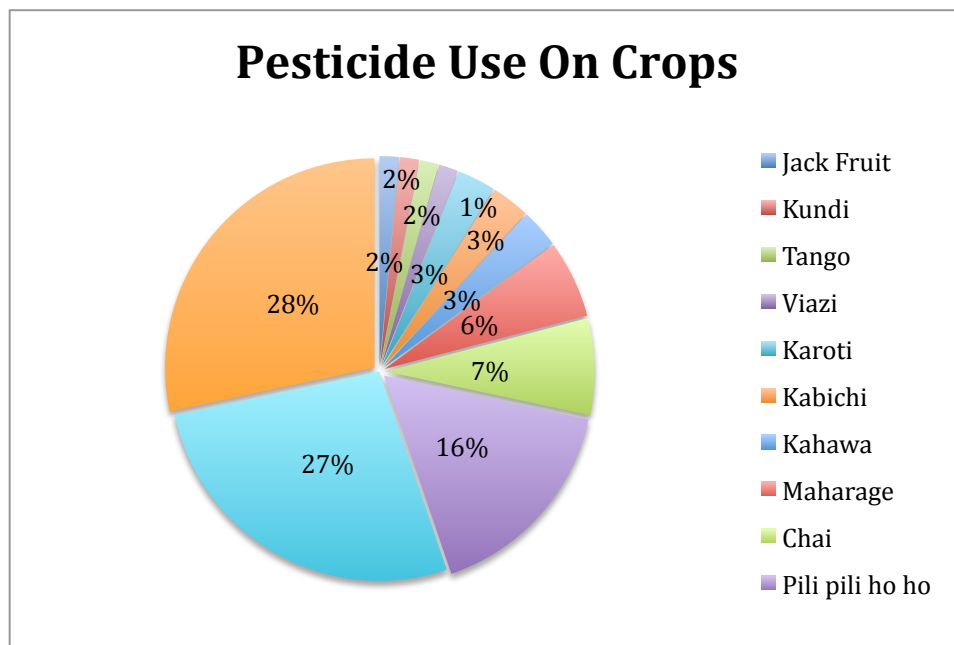


Figure 7. Pesticide Use on Crops. Data collected from structured interviews (n=68) with translator Mgwashi village. April, Tanzania 2013.

The use of fertilizer on crops can be highly beneficial to crop yields when used appropriately. There was a much higher incidence of farmers who use fertilizer than

pesticides on their crops. This in large part was due to the availability of a natural fertilizer option, cow manure (samadi). Crops such as *nyanya*, *pili pili ho ho* and kabichi require the use of chemical fertilizer but many crops benefit greatly from the use of natural fertilizer which is far more readily available (Table 4). If farmers did not personally own a cow it was noted that many purchase manure from a neighbor or a local duka. A total of 75% (54/68) of the farmers interviewed reported using fertilizer on at least one of their crops. Of the farmers interviewed 20.6% (14/68) reported not using any type of fertilizer on their crops, alternatively 4.4% (3/68) reported using fertilizer on all of their crops. These percentages did not differentiate between the use of chemical and natural fertilizer on crops. Of the 20.6% who did not use fertilizer on their crops the reasons farmers listed for why they chose to not use fertilizer included: farming plots did not need fertilizer, fertilizer had never historically been used on their farming plot and most often because they did not have the means to purchase or obtain fertilizer for their crops.

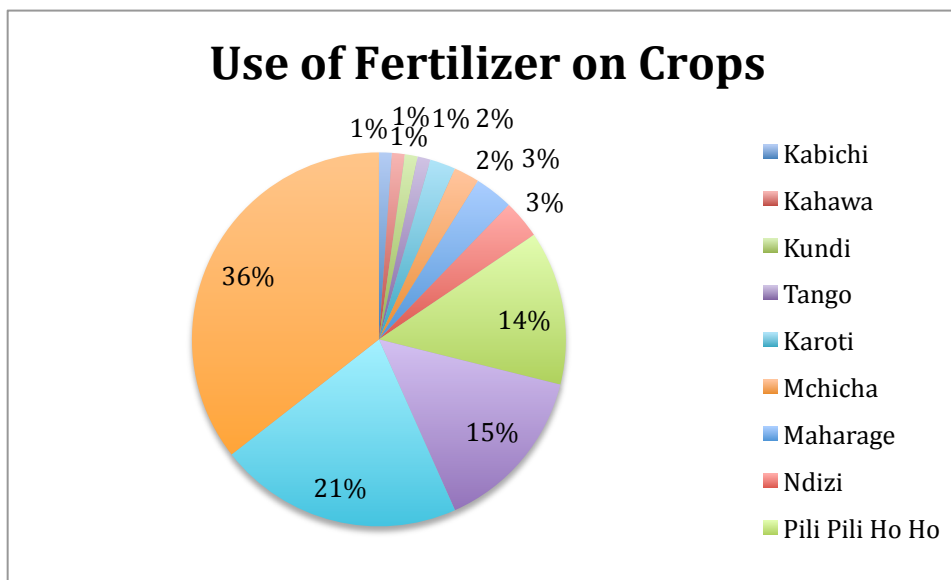


Figure 8. Use of fertilizer on crops. Data collected from structured interviews (n=68) with translator Mgwashi village. April, Tanzania 2013.

Natural Fertilizer- Samadi	Chemical Fertilizer
Mahindi	Nyanya
Maharage	Pili Pili Ho Ho
Migomba	Mchicha
Chai	Tango
Kahawa	Karoti
*if cow manure is available sometimes is added to all other crops	Chai
	Kabichi

Table 4. Crops with highest incidence of fertilizer use. Data collected from structured interviews (n=68) with translator Mgwashi village. April, Tanzania 2013.

Throughout Tanzania Non Governmental Organizations (NGOs) play a significant role in the agricultural sector. Specifically in rural villages such as Mgwashi, Mayo and Sagara NGOs supply aid by providing necessary information, education, tools and administrative skills. The group known as Tanzania Forest Conservation Group (TFCG) first came to the Lushoto District in 1994. Their initial projects were focused primarily on conservation of the Mazumbai Forest Reserve and surrounding forest areas. Since their arrival TFCG has branched out to assist in what they refer to as “conservational” agriculture. The idea of the conservational agriculture is to supply individuals from the surrounding villages with alternative means of income generation so they do not have to rely on the forest lands. TFCG plays a vital role in the agricultural community in the Lushoto District. They have not only supplied farmers with education about cash crop farming such as *nyanya*, *pili pili ho ho* and *kabichi* (which require irrigation) but they additionally have assisted farmers in branching together to create agricultural cooperatives. The group sizes range from 21-25 members and are organized by the farmers. There is an agricultural conservation group currently working in Mgwashi, Mayo and Sagara. Three times per year the groups collectively receive a donation of 100 kilograms of seeds, pesticides and fertilizer. The farmers of the group choose 2-3 days per week that are designated “work days” and on those days they travel to a different members farming plot to work as a group.

TFCG has been able to assist a significant portion of Lushoto District farmers. Of the n=68 farmers interviewed n=5 were members of one of the Mgwashi, Mayo or Sagara TFCG agricultural conservation group. Their impacts as group members went beyond the cooperative. The members I spoke with as well as other farmers in the neighboring villages noted the positive impacts of TFCG. Some examples of the positive impacts TFCG has had on the community included increased agricultural education, education of agricultural inputs such as fertilizer and pesticides, as well as nurseries in many of the villages. While it would not be possible to assist every farmer in the villages of Mgwashi, Mayo and Sagara it was apparent that the individuals who had received donations previously had more secured income and their connection within their village was vital to the role of their local agriculture.

Agricultural Outputs:

In the rural villages of Mgwashi, Mayo and Sagara there are two primary local markets. These markets are the Mgwashi and Bumbuli markets. Here farmers sell both cash crops and subsistence crops. The farmers identified that depending on the season and crop yields they choose to sell their crops locally (subsistence means) or (cash crops) to outside business people who typically transport the crops to either the Soni market, Tanga or Dar es Salaam. Within rural farming communities, such as those found in Lushoto District, the role of business people purchasing and transporting crops is vital to the local level agricultural market.

Lushoto District has a high prevalence of tea plantations, in large part due to the Tanner family estate. There are two main chai factories in the Lushoto/Soni region, Helkul and Mponde. For the purposes of this study Mponde Tea Factory was focused on as 80% of its tea leaves come directly from the farmers in the Lushoto District. In 1970 the Mponde Tea Factory was opened, and is now currently serving over 6,000 smallholders *chai* farmers (Chiduo pers. comm., April 2013). All of the chai purchased by the Mponde Tea Factory is gathered in vehicles that are sent out 1-5 times per week (depending on season and crop yields). At the time of this study there were 100 full time employees working at the Mponde Factory, including the drivers who collect the tea leaves. If they choose to sell to the Mponde Factory farmers are responsible for their tea up until it is weighed and cashed out by the Mponde Factory drivers. The farmers are

paid on credit at varying time scales. Generally farmers are paid on a monthly basis, for this fiscal year the price per kilogram of tea (set by the Tanzanian Tea Board) is 206 TShs. The farmers receive the same price per kilo regardless of crop yield and/or season.

Lushoto District farmers owning a chai plot were notably better off. The consistency of income flow was vital to the success of many farmers. Many individuals voiced that the money they make from chai is put towards savings and the next growing season inputs whereas the money they make from all of their other crops is put toward immediate living expenses.

Throughout Tanzania farmers are increasingly playing different roles within the agricultural sector. These alternative means of income generation come from roles such as business persons in the local Mgwashi/ Bumbuli markets, Soni market, and lastly Tanga and Dar es Salaam. Business persons who purchase crops in Lushoto District can be broken down into three primary categories: small, medium and large scale buyers.

Crop	Purchasing Price	Sale Price	Profit
Nyanya	42000	48000	6000
vitunguu	15000	35000	20,000
kabichi	20000	25000	5000
limao	5000	10000	5000
machungwa	15000	22500	7500
karoti	50000	54500	4500

Table 5. Mayo small scale businessman. List of crops purchased, purchasing price, sale price and profit per individual item.

This role is highly dependent on transportation. The individuals purchasing the crops from farmers often do not personally own a vehicle but either hire a driver or ride a motorbike to the market. The business people buy directly from the farmers plots, set up a stand in the market or buy in large quantities from outside markets. There is an inflow and outflow of crops from the Lushoto District in large due to the work of these business persons. Farmers n=68 noted selling to business persons because they did not have a way to get to the market, the business persons paid them immediately using cash and because they did not have time to work on their farm and go to the market.

Of the n=68 farmers interviewed the reported average income was 603,333 TShs per year. The minimum income generated was 75,000 TShs was an individual who strictly sold *maharage* to the market, using the remaining crops for subsistence. The maximum income generated was noted to be 1.7 million TShs. This individual farmed *chai*, *miwa*, and *maharage*. *Miwa* can be highly lucrative as there is a good market for it in the Lushoto District. Local business persons purchase the *miwa* and use the crops to create a local alcohol.

Limitations and Biases:

Translation:

- For the purpose of this study interview questions were translated from English into both Kisaamba and Kiswahili. This left room for error as any time you are translating from one language to another phrases and wording will never align perfectly.

Time:

- Time was a large factor in that this study took place within a three-week time frame. This
- It was very difficult to gauge exactly how many donations were flowing into and throughout the community. These specific farming villages are very tight-knit which lends to a great sense of community. Individuals expressed on many occasions receiving donations of seeds, pesticides, fertilizer or food from a neighbor or family member.
- Market prices are always fluctuating which resulted in instances of confusion when asking about purchasing and sale prices i.e. month to month, season to season.
- Extremely difficult to quantify inputs and outputs strictly using numbers. It was important to take into qualitative information as well.

Recommendations

- An in depth analysis of agricultural inputs, look at the inflow of seeds, pesticides, and fertilizer into one specific village (I would propose Mayo due to size and relative location to the Mgwashi and Bumbuli markets).
- Complete a study analyzing both inputs and outputs on the local scale to quantify the yearly net profit of individual farmers. This would not be feasible in the three week period, but given a longer time frame a full analysis could be completed.

Conclusion:

This study showed that the market mechanisms influencing the cash crop and subsistence farming dynamic in the villages and surrounding areas of Mgwashi, Mayo and Sagara are most heavily weighted on the output side of the market. The data collected presented the output side of the agricultural market to be the most significant influencing factor with regard to farmers success. It is not the price regulation of agricultural inputs such as seeds, pesticides and fertilizers that is most highly impacting the farmers at a local level. It is rather the lack of markets both physical and economic that is negatively impacting the farmers of these rural farming villages. This negative resulting impact is cyclic in that with poor access to physical and economic agricultural markets farmers in large are not make enough money to purchase the seeds, pesticides and fertilizers necessary to sustain their farms.

The farmers from the rural villages of Mgwashi, Mayo and Sagara do not have access to markets in which they can receive fair prices. If individual farmers have the ability to transport their crops to Tanga or even Soni market (acting the role of a business person) there is opportunity to receive 5 times the sale price they would receive at the Mgwashi or Bumbuli market. The consistency of income generation is vital to the success of the farmers, thus proving the importance of the ownership of chai plots. Accessibility to both physical and economic markets is imperative to the sales of farmers crops at good prices.

There is concern for the future of farmers in this region as increasingly more farmers shift toward growing cash crops, leaving subsistence farming behind. With variable climactic changes and limited agricultural inputs growing crops such as *nyanya* and *pili pili ho ho* can be high risk farming.

NGOs such as TFCG have assisted in fortifying agriculture as a livelihood in areas such as Mgwashi, Mayo and Sagara. Unfortunately with little access to physical markets there are limited options where farmers can choose to sell their crops. Even with cash crops such as *nyanya* and *pili pili ho ho* farmers need to have the means to sustain their farms i.e. purchase agricultural inputs.

Works Cited:

Ten Million Trees Later: Land Use Change in the West Usambara Mountains : the Soil Erosion Control and Agroforestry Project in Lushoto District 1981-2000

Abraham, Beatrice. Translator and Sagara village farmer. Personal Communication. April, 2013 Tanzania.

Beymer, Betsy Anne. "Women's Views on the Political Ecology of Fuel wood use in the West Usambara Mountains, Tanzania." Masters of Geography Thesis, Miami University. Oxford, Ohio 2005.

Conte, C. 2004. Highland Sanctuary: Environmental history in Tanzania's Usambara Mountains. Ohio University Press. Pp 1-215.

Iversen, S.T. 1991. The Usambara Mountains, NE Tanzania; History, Vegetation and Conservation. Uppsala University, Sweden.

Jensen, Abby, "An Assessment of How Land Use and Productivity Has Changed in Villages Surrounding Mazumbai in the West Usambara Mountains, Tanzania: Specifically the Original Tea Plot Allocations Received by Members of the Sagara Group in 1991" (2009). Independent Study Project (ISP) Collection. Paper 763.

Johansson, Lars. "Ten Million Trees Later: Land Use Change in the West Usambara Mountains : the Soil Erosion Control and Agroforestry Project in Lushoto District 1981-2000" Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 2001

Kiparo, Saidi. Mazumbai Forest Reserve. Personal Communication SUA. April 2013 Tanzania.

N.D. Burgessa, b,c et. al. The biological importance of the Eastern Arc Mountains of Tanzania and Kenya. *Biological Conservation* 134 (2007)209–231.

Subject interviews, n=68, As interviews by Carson Casey for Tanzanian Agricultura Markets and the Resulting Effects on Farmers; *Market Mechanisms at a Local Level in the Western Usambara's Lushoto District*. SIT Wildlife Conservation and Political Ecology. Spring 2013, Tanzania.

VanLeuven, Abby. "Valley Bottom Cash Crop Farming and its Environmental Repercussions and Economic Viability in the Villages of Mgwashi and Sagara." SIT Wildlife Conservation and Political Ecology. Spring 2013, Tanzania.

Nuts and Bolts

Mazumbai Housing

The agreed upon rate for SIT students is 7.50 USD per night. This gives daily access to all of the facilities including Mazumbai library, a room with 2 twin beds, bathroom and kitchen with cutlery.

Translator

For my project I used Beatrice Abraham as my translator. I highly recommend Beatrice her English is very strong and she knows the villages of Mgwashi, Sagara and Mayo very well. I paid her a daily rate of 8,000 TSH.

Transportation

The Fasaha bus runs from the Arusha bus stand to Lushoto with tickets costing 15,000 TSH for a one-way trip. To get to Mazumbai you get off at the Soni stop. Here you can find hotelinis for lunch or chai and also purchase any last minute dry goods you may have forgotten.

We arranged to be picked up by Bwana Mheme. He is very kind but be prepared to barter a bit on price. A fair price from Soni to Mazumbai should be around 50,000 TSH with no additional passengers. If there are passengers other than the students travelling the fare should be lowered. He will gladly drive you to Soni for your return trip, though I would advise leaving a little extra time. With the long rains the roads to Mazumbai can become treacherous and Bwana Mhema's gari has a tendency to lose a tire or bumper every now and then. The trip from Soni to Mazumbai can range from 2-4 hours.

Food

Access to dry goods in Lushoto District is limited. I would recommend bringing any kahawa, chai, honey, dry milk, and peanut butter (large size, you will use it). Other items often used for cooking you will not be able to find include lentils, popping corn, coconut milk, tomato paste, and peanuts. The Bumbuli market has a larger selection of dry goods for sale, but is not within walking distance (i.e. more than 20-kilometers). The majority of the produce and necessary dry goods will come from Mgwashi or Mayo.

For an agreed upon price around 10,000 TSH (for travel and cost of food), David or Richard will go to the market and purchase food for the week. Matunda and mboga mboga are very inexpensive but again there is a limited selection that is also dependent on the growing season.

Appendix A: Detailed Tanga Region Map



Appendix B: Interview Questions for Farmers and Key Informants

Interview Questions for Farmers:

- 1) What are the crops you are farming on your shamba?
- 2) Where do you purchase your seeds from?

- 3) Did you or does someone else in your family purchase the seeds?
- 4) If you purchased the seeds, in your most recent growing season what price did you pay?
- 5) Do you use pesticides on your crops?
 - a. If yes, on what crops do you use pesticides?
 - b. If yes what types of pesticides do you use and where do you purchase them?
- 6) Do you use fertilizer?
 - a. If yes, on what crops do you use fertilizer?
 - b. If yes, what types of fertilizer do you use and where do you purchase it from?
- 7) Do you receive donations of seeds, pesticides and/or fertilizer?
 - a. If yes, how many times per year do you receive donations of seeds, pesticides and or fertilizer?
 - b. If yes, what amount of seeds, pesticides and/or fertilizer?
- 8) Did you purchase your land for your shamba?
 - a. If not whom did you receive it from?
- 9) How much land is being used for your cash crops *(Mahindi, Maharage, Nyanya, Chai, Kahawa)?
- 10) How much land is being used for your subsistence crops?
- 11) Where do you sell your cash crops?

To quantify the total yearly profit of individual farmer's cash crops I asked a series of questions regarding individual cash crops farmers identified as being grown on their farms:

- 1) In the most recent growing season what price per (kg/bucket/tanga) did you sell your cash crop for?
- 2) In the most recent growing what amount of cash crop (kg/bucket/tanga) did you sell?
- 3) How many growing seasons out of the year do you harvest the crop?

- 12) Do you sell your subsistence crops?
 - a. If yes, which crops do you sell and where?

To quantify the total yearly profit of individual farmer's subsistence crops I asked a series of questions regarding individual subsistence crops farmers identified as being grown on their farms and sold within the District of Lushoto:

- 1) In the most recent growing season what price per (kg/bucket/tanga) did you sell your subsistence crop for?
- 2) In the most recent growing what amount of cash crop (kg/bucket/tanga) did you sell?
- 3) How many growing seasons out of the year do you harvest the crop?

Interview Questions for the owner of the Mgwashi Duka la Dawa:

- 1) What type of goods do you sell in your duka?
- 2) Who do you sell your goods to?
- 3) Who are your suppliers of the goods you sell?
- 4) What is the purchasing price of the fertilizer you stock in your duka?
- 5) What price do you sell your fertilizer for?
 - a. Please list individual prices of the fertilizers you stock.
- 6) Does the price you sell your fertilizer at vary throughout the year?
- 7) What is the purchasing price of the pesticides you stock in your duka?
- 8) What price do you sell your pesticides for?
 - a. Please list individual prices of the pesticides you stock.
- 9) Does the price you sell your pesticides at vary throughout the year?
- 10) What is the purchasing price of the seeds you stock in your duka?
- 11) What price do you sell your seeds for?
 - a. Please list individual prices of the seeds you stock.
- 12) Do the suppliers of the seeds you have in stock change throughout the year?
- 13) Does the price you sell your seeds at vary throughout the year?
- 14) How do your customers purchase the goods you sell? (i.e cash, credit or trade?)
- 15) Do you think farmers can afford the prices you ask for your goods?
- 16) What is your relationship like with TFCG?

Interview Questions for Business Persons Purchasing Cash Crops:

- 1) What type of crops do you purchase?
- 2) How often do you purchase these crops?
- 3) Where do you purchase the crops?
- 4) How do you decide what price for you will pay for the crops per bucket/kg?
- 5) How do you pay the farmers for the crops you purchase? (i.e. cash or credit)
- 6) Where and to whom do you sell the crops you purchase?
- 7) How many kilos and or buckets on average do you purchase of each crop from an individual farmer on one visit?
- 8) Do the farmers you purchase the crops from vary from week to week? Season to Season?
- 9) Why do you purchase from the farmers in the Mgwashi, Mazumbai, Mayo and Sagara area?
- 10) What profit do you make from selling the crops you purchase from farmers?

Interview Questions for TFCG Representative:

- 1) What is your role within the TFCG organization?
- 2) Where in Tanzania does TFCG work on projects?

- 3) What projects is TFCG currently work on in the Lushoto District?
- 4) When did TFCG start giving donations to members in the Lushoto District? Agricultural donation specifically?
- 5) In what forms does TFCG give donations?
- 6) How does TFCG select the farmers that will receive agricultural donations?
- 7) How many times per year are agricultural donations given?
- 8) In what amount are agricultural donations given to farmers?
- 9) Are the agricultural donations given to the same farmers every year?
- 10) How have the donations TFCG has given in Lushoto District changed farming practices in this area?
- 11) What are TFCG's plans for the future regarding the current Lushoto District projects?
- 12) As a Non Government Organization (NGO), where does TFCG receive its funding?

Interview Questions for Mponde Tea Factory Representative:

- 1) What is your current job title at the Mponde factory?
- 2) What is the history of the Mponde Factory?
- 3) How are the chai leaves collected from the farmers?
- 4) How often are the chai leaves collected from the farmers?
- 5) Are there different grades of chai leaves?
- 6) How are the farmers paid? (i.e. cash or credit) Who decides the price the farmers will be paid per kilogram?
- 7) Does the factory give any donation of seeds, fertilizer or pesticides to the farmers? If yes, to whom, in what amounts and how often?
- 8) Has the factory ever given donations to farmers? If yes, in what forms?
- 9) How many individuals are currently employed at the Mponde factory?
- 10) Where is the chai transported to after it is processed at the factory?
- 11) What are the current regulations on farmers growing crops other than chai in their plots?
- 12) Do you think the chai farmers in the Lushoto District are making enough money from their chai plots to support their families?

History Questions for Mazumbai Hamlet Babu:

- 1) Who were the first to settle the areas of Mazumbai, Mgwashi, Sagara and Mayo?
- 2) Were you living in Mazumbai when the Tanner family was here?
- 3) What types of land use were occurring here prior the arrival of the Tanner Family?
- 4) How did farming practices change during and after the period of the Tanner family?
- 5) What changes have there been in the types of crops being farmed in this area since the Tanner family left in 1982?
- 6) How has the use of pesticides on crops in villages of Mazumbai, Mgwashi, Sagara and Mayo changed over the last 20 years?

- 7) How has the use of fertilizer on crops in villages of Mazumbai, Mgwashi, Sagara and Mayo changed over the last 20 years?
- 8) Have business people always come to this region to purchase crops?
- 9) Have the roads/ means of transportation affected the presence of business people coming to purchase crops?
- 10) How are the farmers in this area doing overall? Are they better or worse off now than when the Tanner family was here?
- 11) Are farmers making enough money to feed their families and continue planting their crops? School? Clothing?

Questions for Agricultural Officer:

- 1) What percentage of residents in the villages of Mazumbai, Mgwashi, Sagara and Mayo farm for livelihood?
- 2) How have the crops farmed in this area changed over the last 20 years? Are farmers planting different crops now than they did 20 years ago?
- 3) How has the use of pesticides in this region changed over the last 20 years?
- 4) How has the use of fertilizer in this region changed over the last 20 years?
- 5) Are farmers making more, less or the same amount of money from harvesting their crops each season than they were 20 years ago? What changes have been noted?
- 6) How have farming practices changed since TFCG first came to the villages of Mazumbai, Mgwashi, Sagara and Mayo?
- 7) What is your relationship with TFCG?

Interview Questions for Chai Nursery:

- 1) When did you start the chai nursery? Who educated you on how to start a seedling nursery?
- 2) Where do you get the seeds and supplies?
- 3) How many seedlings do you grow at one time?
- 4) Who do you sell the mature seedlings to?
- 5) How much does each mature seedling cost?
- 6) How many seedlings do you sell per month?
- 7) How do your customers pay for the seedlings? (i.e. cash or credit)
- 8) Do you educate the farmers on how to care for the seedlings to prepare them for planting?